An Array Feed Radial Basis Function Tracking System for NASA's Deep Space Network Antennas

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Abstract: The use of radial basis function networks for fine pointing NASA's 70-meter deep space network antennas is described and evaluated. We demonstrate that such a network, working in conjunction with the array feed compensation system, and trained using the computationally efficient orthogonal least-squares algorithm, can point a 70-meter deep space antenna with rms errors of less than 0.3 millidegree under good signal-to-noise ratio conditions, achieving significantly higher accuracies than the 0.8 millidegree benchmark for communications at Ka-band frequencies of 32 GHz.